features pointing to an impact origin.

The surrounding area shows no sign of glacial processes that might have excavated the basin, he says. Furthermore, the bedrock shows both radial and concentric fractures similar to those found at such impact sites as Meteor Crater in Arizona and the Wells Creek Structure in Tennessee. The original crater rim, which was probably about 10 kilometers across, shows preferential erosion along known faults in the rock, producing a "distortion" much like that at Meteor Crater.

With the Landsat photos in hand, past data seem to provide additional support. Streams in the area, for example, have been found to have unusually high concentrations of nickel, a metal often found in recovered meteorites. The local bedrock (pre-Cenozoic granite, schist and ultramafic rocks) is of the sort that could provide the nickel, Cannon acknowledges, but "no collaborating evidence could be found for the existence of a parent ore body. . . ." An aerial survey of the region's magnetic field has indicated "a substantial magnetic low," which could have been produced when the igneous and metamorphic bedrock that now shows arose through the fractures created by the impact.

The lake itself is about 3 kilometers across, roughly in the center of the depression whose eroded rim is now about 12.4 kilometers across and 500 meters deep. Its overall structure, Cannon says, is much like that of the Lake Bosumtwi impact structure in Ghana. It has been calculated that a meteorite capable of creating such a feature—a crater some 10 kilometers in diameter—would be "somewhere near 50 million metric tons." □

The 2nd largest U.S. meteorite

UPI

Clarke with 3-ton Old Woman meteorite.

The second largest meteorite ever discovered in the United States was unearthed last week from the Old Woman Mountains, 170 miles east of Los Angeles. Rightful possession of the 3-ton iron-nickel object, however, is being disputed principally between the finders and the Smithsonian Institution.

David Friburg, Mike Jendruczak and Jack Harwood found the buried meteorite in March 1976 while searching for gold. They did not advertise their discovery, however, so until now only a few individuals were aware of the finding.

The meteorite's weathered appearance indicates it must have lain in the rugged terrain for hundreds, perhaps thousands, of years, said Roy S. Clarke, curator of meteorites at the Smithsonian Institution. The meteorite left no visible impact crater.

Preliminary analyses reveal that the massive 30-cubic foot fragment is one of a rare variety known as Type IIB. Only 14 of the 2,000 known meteorites are definitely this kind.

The three finders claim rightful ownership based on the 1872 Mining Act. The relevant portion of the law refers to any discovery of an "ore body of commercial size and value," according to Joe Gulliksen, area manager for the Bureau of Land Management in Riverside, Calif. From this standpoint, he said, the meteorite is just a few tons of iron, hardly a commercial quantity.

The Smithsonian claims ownership based largely on substantial legal precedent. Past judicial decisions have invariably awarded possession to the owners of the land on which the disputed meteorite landed, said Gulliksen. In this case, the impact occurred on federal property.

The meteorite's removal was arranged through the Bureau of Land Management and executed by the U.S. Marines. Currently the Old Woman meteorite is on public display at the Bureau's office in Riverside. If all proceeds according to Clarke's arrangements, the huge chunk will be hauled onto a truck bound for Washington, D.C., on July 1. □

Diet not cause of hyperactivity

University of Wisconsin researchers say they found no evidence to support the popular theory that food additives cause hyperactivity in a large percentage of hyperactive youngsters. The Wisconsin results are being sharply disputed by San Francisco allergist Ben F. Feingold, who has developed a substantial following since he first proposed the connection between additives and hyperkinesis nearly five years ago.

In a series of tests over the past two years, the Wisconsin team of psychologists and neurologists observed and measured the reactions of 46 boys who were previously identified as hyperactive by their physicians, parents and teachers. Hyperactivity more often strikes boys than girls, the researchers say. After an initial two-week period of physical, neurological and behavioral observations of the children while on their regular diets, the youngsters were divided into two groups. Each group was then alternately exposed for three to four weeks to Feingold's prescribed additive-free diet and a control diet that included average amounts of artificial colorings and flavorings.

Feingold had initially suggested in 1973 that perhaps 30 to 50 percent of hyperactivity cases are caused by synthetic colors and flavors. The chemical complexities of food additives have prevented anyone from pinpointing exactly what components might be responsible for hyperactivity, according to J. Preston Harley, a neuropsychologist who headed the Wisconsin study. However, Feingold asserts in a book and other reports that his diet has produced dramatic improvements in up to 50 percent of hyperactive children. While such children's reactions to additives are not allergies in the strict sense of the term, they do indicate some type of behavioral toxicology, Feingold says.

But, says Harley, "Feingold's claims are based on his clinical experience—not on systematic, scientific investigations or published studies." Fueled by such doubts, Harley embarked on the $250,000 study in 1975. To maximize the chances of the children's compliance, the university provided the total food supply for the participating families and instructed all family members to eat nothing else. Nonadditive diets were disguised—items such as novelty snack cakes were specially prepared from only natural ingredients—so neither the families nor the observers were sure which diet they were on.

During the testing period, youngsters were rated by parents, teachers and researchers on items such as attention span, restlessness and irritability at home, school and in a laboratory. In addition, follow-up EEG, blood, urine, reaction and motor tests were performed and compared with prestudy measurements. As a further control, all children who were taking antihyperkinesis medication were removed from the drugs prior to the study.

The results: "We are unable to support with anything approaching reasonable scientific certitude Dr. Feingold's far ranging assertions regarding the prominent and predictable causitive role played by artificial food colors [and flavors] in the development and maintenance of hyperactive behavior," Harley says. "Our results not only fail to approximate his anecdotal reports, but they fail to support them even in sharply attenuated form."

Diet had no appreciable effect on hyperactivity, according to a statistical analysis of the test data and observations. However, nine preschoolers did show some improvement on the Feingold diet (the sample consisted of 10 preschool youngsters and 36 6 to 12-year-olds) as rated subjectively by their parents, Harley notes. And even though the researchers' observations and neuropsychiatric test results did not corroborate the parents feelings, the research team performed a follow-up study on those nine children.

For nine weeks, the preschoolers were kept on strict Feingold diets, but they were alter-

nately fed specially prepared cookies and candy bars that either contained synthetic colors or strictly natural components. "Feingold had said that even a small deviation from his diet would set a child off and the youngster would revert back to hyperactive behavior, Harley says. "So we challenged the youngsters with artificial foods to see if we could indeed turn such behavior on and off."

The follow-up showed no such "on-off" effect, the youngsters remained essentially unchanged by diet, the researchers report. One child did show some signs of reacting to the manipulation, but Harley says even that case was "not entirely consistent with the expectations," Feingold indicated. In any case, Harley adds, "we're talking about 1 child in 46" who showed signs of being altered by diet.

Feingold disputes the Wisconsin group's conclusions more than its findings. "Their study is actually very strongly supportive [of his theory], even though they [the Wisconsin team] tried to discredit it," he told SCIENCE NEWS. The favorable parents rating of the preschoolers indicates that diet *does* influence hyperactivity, he says. "The issue is 'Does it occur ?'" Feingold says. "That's all we want—we're not debating the statistics, because the statistical evaluation has no meaning at all." The final statistics are flawed, Feingold asserts, because the Wisconsin design was faulty and did not control the youngsters' food supply outside the home. "These [hyperactive] children are notorious liars," he says. In all likelihood, many of the test subjects exchanged food with peers at school, he suggests. "With this lack of control of food supply, it's remarkable they got any [indications that diet affects hyperactivity] at all."

Harley replies that the team "did the best job possible of maintaining control of the diet, short of having the youngsters in a locked ward." And he adds that the parents' questionnaires indicated that the children adhered to the diets and, in fact, "got off on" participating in the study.

"We're not saying that no kids respond to the diet—and our results indicate that maybe we should start looking more at preschool youngsters in this regard [of possible dietary effect]," he says. "But it [the effect of additives] is definitely not of the degree and magnitude that Feingold has been talking about." □

New way to detect variant hemoglobins

More than 275 different hemoglobin variants have been identified in humans, most of which are due to the substitution of a single amino acid in one of the two polypeptide chains that constitute the hemoglobin protein. Although most of these hemoglobin mutants are rare and innocuous, a handful are common and pathological. The most infamous is the S hemoglobin variant. Its amino acid replacement at position six in the beta polypeptide chain makes it clump and disrupt blood cells so that they become sickle-shaped. The result is sickle cell anemia.

Although techniques such as chromatography and electrophoresis can separate out hemoglobin variants and purify them to a large degree, positive identification of such variants can come only from detailed structural analyses. Such a three-step pathway toward identification not only is time-consuming but also requires an ample amount of purified hemoglobin. Now an equally specific but easier route to identifying pathological hemoglobins has been devised. It is radioimmunoassay.

Fred A. Garver and his colleagues at the Medical College of Georgia in Augusta first took blood samples from patients whose abnormal hemoglobins had already been identified by chromatography, electrophoresis and ultimately structural analysis. They subjected the blood samples to column chromatography, which separated hemoglobin from other components in the blood, and then to gel electrophoresis, whereby purified hemoglobin migrated in the gel column as single bands.

Extracting the purified hemoglobins, they injected them into rabbits or chickens. The animals made antibodies (antisera) to the hemoglobins. The researchers then evaluated the feasibility of using the antisera from the animals as a radioimmunoassay to identify abnormal hemoglobins in red blood cell hemolyzates (preparations resulting from the destruction of red cells). They found that each antiserum was able to distinguish a particular hemoglobin variant by recognizing its single amino acid substitution and that each ignored normal hemoglobins or hemoglobin variants containing other amino acid exchanges. In other words, the radioimmunoassay they devised is a sensitive and specific test for various hemoglobin variants. Still another bonus is that the assay can measure the amounts of hemoglobin deviants present in blood hemolyzates in quantities as low as one percent of the deviant. Their evidence also suggests that the assay can be used on newborn as well as adult blood. They believe that the test may likewise work on blood drawn from fetuses by amniocentesis.

As the researchers explain in the June 17 SCIENCE, an immunochemical method for identifying and measuring pathological hemoglobins offers certain advantages over current methods. Because three different techniques — chromatography, electrophoresis and structural analysis—must be currently conducted to conclusively identify a hemoglobin variant, radioimmunoassay, being one technique, should be easier and quicker. Still another advantage of radioimmunoassay is that only tiny amounts of red cell hemolyzates are needed for hemoglobin measurement, compared with the large amounts of purified hemoglobin required for hemoglobin structural analyses.

"These features appear to make the radioimmunoassay of considerable importance in the analyses of hemoglobin variants," they conclude. □

Wernher von Braun: 1912-1977

NASA

A dreamer, an engineer and a pioneer have died. Their name was Wernher von Braun. Born in Wirsitz, Germany, on March 23, 1912, the man chiefly responsible for both the V-2 weapon and the rocket that sent men to the moon passed away on June 16 after an extended bout with cancer.

His father, Baron Magnus von Braun, was a Prussian aristocrat who went on to become secretary of agriculture in the Weimar Republic. His mother, however, was an amateur astronomer, avid enough that as a confirmation gift she presented young Wernher with a telescope. His interest in space—perhaps the seeds of his career—were further developed when he read a book by early rocket researcher Hermann Oberth on the subject of rockets as interplanetary propulsion.

Even at the height of the German war effort, for which von Braun's group developed the devastating V-2 ballistic missile, his interest in space showed through. Following a successful test of the V-2 in October of 1942, he is reported to have said, "Today, the spaceship was born."

Von Braun and about 120 of his colleagues surrendered to the Allies in 1945, coming to the United States that September to begin work on a succession of missiles that led to the development of the Jupiter-C. After Sputnik 1 shook the world in 1957, von Braun headed an 84-day crash program in which a Jupiter-C became the first rocket to successfully carry a U.S. satellite—Explorer 1—into orbit, on Jan. 31, 1958. That September, design work began on the Saturn series of rockets that would ultimately blaze the trail to the moon. Von Braun's death came only two days before the successor to the Saturns—the space shuttle—carried human beings for the first time (though the craft was carried by the jet aircraft to which it was attached) in a successful test in California.

July 20, 1969, only minutes after Neil Armstrong had descended from the Apollo 11 lunar module to make the first human impressions on the surface of the moon: "Do you know whose footprints those are?" asked a high-ranking Apollo official. "Wernher von Braun's." □